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AUTHOR Gregg, Soleil
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ABSTRACT

This policy brief discusses students with attention deficit hyperactivity disorder (ADHD) and their school performance. Reasons are presented to explain why children with ADHD fail. The three main characteristics of ADHD (inattention, impulsivity, and hyperactivity) and their interference with academic performance are discussed. The brief describes the problems with traditional classroom practices that make schooling an ordeal for many children with ADHD, including school demands for self-control and self-direction. The belief that many school problems experienced by children with ADHD do not result solely from biological factors but from a mismatch between the child and the environment is reviewed. The report evaluates schools' responses to academic failure and school-child relationships. A multimodal treatment for ADHD is recommended that includes a combination of academic, behavior, and medical interventions to help children succeed. The brief describes the necessity of the participation of parents, health-care professionals, and school personnel for effective treatment. Types of interventions are explained, including: specific, individual accommodations; behavior management techniques; modification of test delivery; homework tailoring; reduction of class size; and comprehensive changes in the school environment. Questions for policymakers and educators to ask when evaluating an education program are provided. (Contains 43 references.) (CR)

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ADHD—Building Academic Success

If human potential were determined at birth, we would have little need for schools. However, we know that environment plays a powerful role in individual growth. We create schools to develop that potential and broaden opportunity. Yet many children labeled at-risk—including those disabled by Attention-Deficit/Hyperactivity Disorder (ADHD)—fail to thrive, or even survive, in current school environments.

As schools attempt to help all students meet new goals for learning set by state and national standards, education policymakers, administrators, and teachers must determine how to create learning environments that nurture those students who fail to learn in traditional school settings. This brief will examine how the mismatch between school environments and children with ADHD contributes to school failure, and will review suggested changes in policy and practice that can help schools become places of growth and development for all students, including those with ADHD.

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ADHD and School Failure

For children with ADHD, "school too often starts with failure . . . and goes downhill from there."[1] With failure rates double to triple those of other children, about 50 percent repeat a grade by adolescence.[2] Thirty-five percent eventually drop out of school and only 5 percent complete college.[3] One study found that, by age eleven, 80 percent were at least two years behind in reading, writing, spelling, and math.[4] Even children with normal to superior intelligence show "chronic and severe underachievement."[5]

Unusually high suspension and expulsion rates further compromise school achievement and completion. A long-term study found that 46 percent of children with ADHD had been suspended and 11 percent had been expelled.[6] Taken together, expulsion and dropout rates approach 50 percent—an alarming statistic, since children with ADHD compose up to seven percent of the population.[7]

The three main characteristics of ADHD—inattention, impulsivity, and hyperactivity—can interfere with academic performance. Children with ADHD pay attention to what is novel or stimulating and may have trouble focusing on important information rather than on extraneous details or background noise. They may be unable to sustain attention, especially during repetitious, rote, or prolonged tasks, or in situations of decreasing novelty. Hyperactivity—motor and verbal—will probably be seen as misbehavior when children are expected to sit quietly. Finally, impulsivity causes difficulty in any task requiring a delay: raising hands to answer questions, reading or listening to directions, asking questions to clarify information, planning, and organizing.[8]

Deficiencies in executive brain functions tied to motivation, analysis, goal-setting, and problem-solving can seriously impair academic performance among children with ADHD.[9] In addition, up to 50 percent of children with ADHD have coexisting learning disabilities, especially in spelling, reading, writing, and math.[10,11]

The purpose of this brief is to help policymakers understand Attention-Deficit/Hyperactivity Disorder (ADHD) and its effects on students. It is the third in a series of Policy Briefs about ADHD, a disorder characterized by excessive degrees of inattention, impulsivity, and hyperactivity. The first brief addressed the legal responsibilities of schools to serve students with ADHD. The second brief discussed steps to effective intervention.

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The Mismatch of ADHD and School

Traditional classroom practices make schooling an ordeal for many children with ADHD.[12] From kindergarten on, their biologically based inability to inhibit behavior and control responses[13] prevents them from meeting typical school demands for self-control and self-direction: to stay in their seats until given permission to get up, to raise their hands before talking, to pay attention when the teacher speaks, to follow directions, to complete repetitive work within time constraints, and to become increasingly independent and organized.[1]

Some observers, including Pelligrini and Horvat, suggest that many school problems experienced by children with ADHD do not result solely from the inborn, biological factors that underlie the disorder, but from a mismatch between the child and the environment (school).[14,12,15,16,17,1] The same observation applies to at-risk students in general. Based on their review of the literature, Rossi and Montgomery believe risk is "best conceptualized as . . . societal, home, or school dysfunction rather than as qualities inherent in children."

Research shows that many within-school variables can influence children's behavior. For instance, attention span can be affected by (a) interest due to gender preference, (b) task difficulty, and (c) task duration—children pay more attention to subjects that interest them, their attention wanders if they don't understand the material, and their attention wanes over time.[14] Challenging—but not frustratingly difficult or boring—tasks also motivate children to learn.

School success or failure depends on "goodness of fit": how well within-child variables (such as biological predispositions) interact with environmental variables (such as classroom expectations). In the classroom as in the world, "biology and environment are interactive."[14] Again, the at-risk literature echoes this sentiment: "The degree of 'fit' between a child's abilities and the demands of school life, the extent to which there is consonance between home and school expectations, and the extent to which school activities appear rewarding influence a child's readiness to meet school requirements."[18]

Worksheet-dependent classrooms cause double trouble for these active, social children. They not only ignore the child's learning styles and strengths, but they also label as misbehavior the child's natural tendency to interact with the environment.

ADHD is not like strep throat, which one either has or doesn't have; instead, the severity and consequences of ADHD symptoms relate to environmental demands on behavior. For example, a child with ADHD may not stand out at recess, but will be more easily spotted in situations requiring "sustained effort, inhibition, organization, and self-regulation." Similarly, a child may exhibit fewer symptoms in a whole language classroom that encourages activity and collaboration than in classrooms requiring long periods of quiet, independent seat work.[17]

Worksheet-dependent classrooms cause double trouble for these active, social children. They not only ignore the child's learning styles and strengths, but they also label as misbehavior the child's natural tendency to interact with the environment.

Schools' Response to Academic Failure

Well-meaning programs to help failing children often consist of trying to change the child to fit the school environment. They may pull children out of the classroom, apply some sort of remedial strategy, then attempt to reinsert them successfully into the original situation and setting. Or schools retain children in a grade with hopes that they will catch up to the prescribed learning sequence the next time around.

While a few intervention programs have demonstrated success (e.g., Robert Slavin's Success for All), many remedial strategies are ineffective.[21] Too often, they assume that the child is the problem. This one-sided view not only isolates the child from the context of the learning environment, but it also precludes the exploration of environment-based solutions.[14] Certainly, many frustrated teachers have experienced environmental constraints (limited time, lack of resources, and too many other students) when attempting to meet individual learning needs. Reeve warns, "unless the school environment is altered to make it match the unique constellation of needs pre-

sented by students with AD[H]D, negative outcomes will continue."[1] Surely, schools should consider both the learner and the learning environment when planning intervention strategies.

School-Child Relationships: A Transactional Model

A transactional model of school-child relationships shifts the main work of educators away from correcting deficiencies in special-needs and at-risk children to accommodating weaknesses while "designing instructional environments that match [their] strengths."[34] This model raises the issue of schools' readiness to teach children with diverse needs, as well as children's readiness to learn.[35]

A transactional, two-way model of school performance encourages schools and families to meet halfway to share responsibility for children's learning. Through collaboration, schools, families, and community support systems can improve the fit between children and school environments to increase the probability of success.

Multimodal Treatment: Sharing Responsibility for Learning

Experts recommend multimodal treatment for ADHD—a combination of academic, behavioral, and medical interventions to help children succeed at home and school. Multimodal treatment requires teamwork and assumes shared responsibility for school success. It involves a child's parents or caretakers, health-care professionals, and school personnel—teachers, administrators, special educators, and school psychologists—working together to design effective intervention plans that address individual weaknesses and build on strengths.

Interventions may include giving information and training to parents and teachers about ADHD, behavior modification techniques, counseling, social skills training, medication, and classroom accommodations. To meet schools halfway, families can seek information, training, and counseling, as well as possible drug therapy for the child; and they can communicate and collaborate with schools and teachers to support learning. To meet families halfway, schools can help provide information and access to school and community support services, communicate and collaborate with families, and make appropriate accommodations in the school environment.

Through collaboration, schools, families, and community support systems can improve the fit between children and school environments to increase the probability of success.

Accommodations in the school environment range from specific plans for individual children to more comprehensive changes in school procedures, practices, and policies. Schools must provide specific accommodations to disabled individuals by law, while comprehensive changes in school environments depend on the discretion and will of educators, administrators, school governance bodies, and policymakers.

Specific, Individual Accommodations

Specific accommodations that compensate for individual weaknesses can be critical to the success of children with ADHD and should be part of the child's IEP or 504 plan. Since no two children with ADHD have the same strengths and weaknesses, specific accommodation plans should be developed for each child. The U.S. Department of Education counsels that "Plans should, at a minimum, identify students' characteristics and special learning needs and provide sound ideas for strengthening their academic and social performance."[36]

In a 1991 memorandum, the Department suggested some possible modifications for children with ADHD in regular education classrooms:

> Providing a structured learning environment; repeating and simplifying instructions about in-class and homework assignments; supplementing verbal instructions with visual instructions; using behavioral management techniques; adjusting class schedules; modifying test delivery; using tape recorders, computer-aided instruction, and other audiovisual equipment; selecting modified textbooks or workbooks; and tailoring homework assignments. Other provisions range from consultation to special resources and may include reducing class size; use of one-on-one tutorials, classroom aides and note takers; involvement of a

"services coordinator" to oversee implementation of special programs and services, and possible modification of nonacademic times such as lunchroom, recess, and physical education.[22]

Behavior management techniques. Children with ADHD perform best with clear expectations and immediate feedback. They may need extra help from behavior modification plans to meet classroom expectations such as completing work and restraining movement. While such plans may temporarily change a behavior, thereby improving grades—children complete more assignments, resulting in a higher average—they do not address learning problems. Modified behaviors, moreover, do not automatically generalize to other settings. Research has shown the following types of behavior modification to be effective for students with ADHD.[23]

- **Positive reinforcement**—the place to start when developing plans—ranges from frequent positive feedback (praise) to token reward systems, in which children ca earn treats and privileges for specified behavior.
- **Behavior reduction strategies**—negative feedback; short, immediate reprimands; and redirection—effectively reduce undesirable behaviors and should be used along with positive reinforcement.
- **Response cost**, which combines positive reinforcement (earning tokens that can be exchanged for privileges or rewards) and punishment (deducting tokens for undesirable behavior), can increase on-task behavior and work completion.
- **Correspondence training** rewards children for matching their words (intentions) to actions: they promise to complete a task, then do it; or do the task, then report it.[24]

Modifying test delivery. Children with ADHD may have problems with executive function and written language, so they may better demonstrate knowledge of material through oral testing, performance testing, or other alternative demonstrations of accomplishment. Students can be provided extra time to complete tests or quiet testing areas away from distractions.

Children with ADHD may benefit from modified or shorter assignments. Even older students may need help managing their time and keeping track of assignments, textbooks, and other instructional materials.

Tailoring homework. Children with ADHD may benefit from modified or shorter assignments. Even older students may need help managing their time and keeping track of assignments, textbooks, and other instructional materials. Daily assignment sheets that parents can monitor at home, subject dividers and pencil pouches for notebooks, an extra set of textbooks to keep at home, and assistance planning and executing long-term assignments can boost homework completion.

Reducing class size. Barkley[25] recommends small classes for children with ADHD. He says that "12-15 is ideal, while 30-40 is unmanageable." Other strategies for lowering the pupil-adult ratio include using classroom aides, team teaching with resource personnel, and enlisting parent volunteers.

One-on-one tutorials. Class-wide peer tutoring—which pairs students for drill-and-practice activities—has been shown to be effective for children with ADHD. It provides them the immediate feedback they need, while reducing demands on teachers' time.[26]

Since fostering self-esteem is critical to their treatment, children with ADHD need to develop and recognize their increasing academic competence.[26] The best intervention strategies maximize a child's success and are designed so that the child takes credit for the success.[27] They also consider a child's individual strengths and weaknesses within the context of particular classroom situations and requirements. Busch offers sound advice: "Accommodate the child's difficulties . . . and teach to the child's strengths and abilities."[28]

Comprehensive Changes in School Environments

A teacher who must manage a classroom that includes several children with special needs—all requiring individual accommodations—takes on a tremendous burden. Comprehensive changes that make schools and classrooms more nurturing may eliminate the need for so many individual accommodations—lifting the burden from teachers while improving student outcomes.[1] Many current local, state, and

national school reform efforts focus on changes in school environments in order to make schooling a better experience for all children.

Unfortunately, little research specific to interventions for ADHD exists to guide educators and policymakers. While the knowledge base is growing, a review of the literature shows "serious gaps" regarding effective academic strategies, and even less is available from the policy perspective.[23,29] Fortunately, the research is beginning to show that what is good for all students works with children with ADHD (Maurice McInerney, personal communication, January 8, 1995). In addition to specific research on ADHD, educators and policymakers can turn to related research—such as the at-risk, school reform, and motivation literature—to begin the process of building nurturing environments.

In their review of the literature on at-risk students and school-reform efforts, Rossi and Montgomery report that policymakers have proposed "significant changes in curriculum, instruction, assessment, and organizational strategies . . . to create a challenging, nonstigmatizing learning environment that meets student needs."[18] When proposing such comprehensive changes, policymakers should consider four issues to provide at-risk children the opportunity and motivation to learn: academic success; relevance of the school program; positive, supportive relationships with teachers at school; and supportive conditions beyond school.[21]

Multimodal treatment for ADHD attempts to improve academic success, in-school relations, and out-of-school support through individual accommodations and collaboration among school personnel, families, and community support systems (including medical professionals). Relevance of curriculum, however, goes beyond the legal requirements of individual accommodation and into the realm of policymaking. The following sections look at proposed changes in curriculum, instruction, assessment, and organization and how they relate to children with ADHD.

Curriculum. A curriculum that is irrelevant to students' social and economic interests has been shown to contribute to poor performance, dropping out, and rebellious behavior. To be intrinsically motivating to any student, curricula need to be "interesting, challenging, and providing opportunities for initiative and creative effort."[21] Many observers echo these sentiments regarding children with ADHD. Barkley[30] says that interesting, challenging, and meaningful experiences are more apt to keep children with ADHD motivated and engaged. Since students with ADHD function in the realm of the immediate, he says, they may not work for delayed rewards such as grades: the reward must be in the task itself.[31]

. . . interesting, challenging, and meaningful experiences are more apt to keep children with ADHD motivated and engaged.

Weaver says that offering children with ADHD "meaningful learning experiences" helps them focus and concentrate."[17] Her research has shown that children with ADHD respond well to a meaningful, whole-language curriculum that "offers . . . choice and ownership, and that supports learners in taking more responsibility for their own learning and their behavior." She then supplies organizational and other support to individual students as needed.

Kohn[19] favors a constructivist, student-centered curriculum that allows students to choose alternative assignments, connects learning to real-life experiences, and embeds less interesting tasks in more appealing activities. A curriculum that emphasizes **collaboration, content, and choice**, he says, internally motivates students to learn and reduces the need for rewards and punishments to stimulate interest and control behavior.

- **Collaboration** promotes learning through active interaction with information and other people. An increasingly popular form of classroom collaboration—cooperative learning—has been shown to engage students and increase achievement. Experts[16,17,32] recommend cooperative learning for students with ADHD.
- **Content**, in Kohn's discussion, includes both what is taught and how it is taught. Kohn believes that many school tasks are "not worth doing" because they overemphasize rote memorization, discourage creativity, and fragment information. This combination can be disastrous for children with ADHD, who, because of their biologically driven need for stimulation, have little tolerance for boredom.[32] Instead, he supports a curriculum that relates topics to students' lives and concerns, involves chil-

dren through inquiry and meaningful experiences, and teaches responsibility and problem-solving through real-life applications.

- **Choice**, or self-determination, is critically linked to motivation. Kohn, like Weaver, advocates involving children in substantial decisions about their learning, from a choice of reading and writing assignments to alternative ways to demonstrate learning.

To promote interest and increase the social and economic relevance of curricula, policymakers have proposed incorporating real-world experiences into the curriculum, integrating vocational and academic instruction, and developing school-to-work programs and apprenticeships.[22]

Instruction. Research has shown that instructional strategies from the effective-teaching literature benefit children with ADHD in regular education classrooms. These include previewing the lesson, providing direct instruction, connecting information to students' prior knowledge and personal experience, checking for understanding, and preparing students for transitions to the next activity.[23]

Studies have also found that **task stimulation**—adding stimulation to instruction, rather than reducing it—can improve performance and behavior in children with ADHD.[23] To help improve cognitive outcomes, Zentall[24,5] recommends that teachers add novelty, stimulation, and activity to teaching materials and methods. Methods include active learning and high response opportunities—building more verbal response and motor activity into academic tasks (e.g., group work, choral responding, flip cards, talking), and adding color to instructional materials (e.g., colored notebook paper or colored print), especially for rote tasks.

Computer instruction, especially games without excessive animation, has been shown to increase attention in students with ADHD.[25] Computers also allow individuals to work at their own rates and levels, provide immediate feedback, and help develop problem-solving skills. Word processing programs with spell checks accommodate students who have difficulty with writing and spelling.

Research has shown that instructional strategies from the effective-teaching literature benefit children with ADHD in regular education classrooms.

Finally, experts recommend instructional strategies that draw on children's strengths rather than emphasizing their weaknesses. Zentall[32] has found that children with ADHD are "learn by doing, trial and error learners" who will work "to get something (stimulating, active, novel)" or "to get out of or away from something (repetitious, boring)."

Some strategies or theories that help schools identify and address students' areas of strength include learning styles,[36] multiple intelligences,[37] and human dynamics.[38]

Assessment. Disabilities can penalize children with ADHD on tests and cause poor performance. Impulsivity causes errors on multiple-choice items,[5] memory problems impede retention of factual information, impairment of executive function interferes with essay writing, and hand-writing difficulties consume limited time. Authentic or alternative assessments that allow students to "demonstrate what they have learned rather than how well they take a test"[22] may provide educators and policymakers with clearer information about the effectiveness of both individual accommodations and changes in school environments.

Many state and federal agencies and professional organizations are developing assessment measures tied to new content-area standards and curriculum frameworks. Due to concerns that schools often exempt special education students from state-level assessments—leaving policy-makers little data for measuring their progress toward education goals or determining accountability—the National Center on Education Outcomes has recommended that state and federal agencies develop guidelines for including these students in assessments and "develop and study . . . modifications, accommodations, and alternatives" that will allow them to participate.[39] Eligible students with ADHD are currently provided modifications such as extra time, separate testing areas, and the use of calculators on college entrance and General Equivalency Diploma (GED) examinations.

Organization. Part of the misfit between schools and at-risk children may result from mixing economics and education—using free market values of competition and survival of the fittest (or "smartest")[40] to achieve the mutually exclusive goal of universal

excellence. As in many Olympic events, classroom time is one variable that separates the winners from the losers.

As the National Education Commission on Time and Learning[6] reports, time "governs how material is presented to students and the opportunity they have to comprehend and master it," so that "the boundaries of student growth are defined by schedules for bells, buses, and vacations instead of standards for students and learning." The Commission believes that "fixing [this] design flaw" opens the door for needed reforms: accommodating young children at different levels of readiness; radically changing teaching and learning by encouraging practices like block scheduling, team teaching, and integrating disciplines; ending the practice of grouping children by age; adjusting classrooms to meet the individual student's needs and learning styles—"offering more frequent breaks, providing more opportunities for hands-on learning, encouraging group work"; and allowing more individualized instruction.

Research shows that schools' scheduling practices affect students' attention and activity levels. Children's ability to remain on task and their need for breaks naturally varies according to age and developmental level. Organizing instruction and breaks around students' developmental needs could help maximize concentration, reduce inappropriate activity, and improve time on task for all children, including those with ADHD.[14]

Lack of time in school also limits teachers' opportunities for planning, collaboration with others—including peers, parents, and support personnel—and staff development. Multimodal treatment for students with ADHD requires that teachers have this extra time within the school day, yet in reality, few do.

Organizational constraints influence other decisions about teaching and learning that adversely affect children with ADHD. For instance, class size may help determine choice of teaching methods and learning activities, as anyone brave enough to do **anything** with 25-30 children can imagine. Understandably, teachers may choose to assign independent seat work rather than attempt collaborative, hand-on activities. They make this choice as much for management and crowd control as for educational benefit, of course, but a preponderance of seat work exacerbates the symptoms of students with ADHD and does little to promote genuine learning for anyone.

Collaboration and consistency among teachers especially benefit students with ADHD, who function best with routine, structure, and consistent expectations.

Policymakers have proposed new organizational strategies to increase support for at-risk students. To combat impersonalization at the secondary level caused by large schools and frequent class changes, they have created smaller academic units within large schools ("schools within schools") and interdisciplinary teacher teams.[21] These strategies allow teachers and students to get to know each other and help teachers collaborate to address individual student problems. Collaboration and consistency among teachers especially benefit students with ADHD, who function best with routine, structure, and consistent expectations.

Monitoring Performance

Because educators and policymakers must forge ahead to improve education outcomes for all students, including those with ADHD, they must carefully monitor student progress and evaluate whether programs and policies yield desired results. A school environment that nurtures the growth and development of children with ADHD would, at the very least, decrease dropout, suspension, expulsion, failure, and retention rates; and increase enrollment in college and postsecondary training programs in this population.

Questions for Consideration

To build nurturing environments for children with ADHD and other at-risk students, policymakers and educators may want to ask the following questions:

- Does instruction draw on students' strengths or focus on weaknesses?
- Does the curriculum interest, challenge, and engage students?
- Is the curriculum relevant to students' social and economic needs?
- Do classroom assessment instruments penalize children with disabilities or measure what they know?
- Do children with ADHD participate in state assessment

measures? Do schools provide accommodations that allow them to participate?

- Do school schedules and calendars take precedence over students' individual developmental and learning needs?
- Do teachers have time to meet student needs, collaborate with peers, and develop their knowledge and expertise?
- Does short-term efficiency (school and class size) matter more than long-term effectiveness (learning and growth)?
- Do schools aggregate and monitor outcome data for students with disabilities (dropout, suspension, expulsion, failure, and retention rates; and enrollment in college and post secondary training)?

Conclusion

As a nation, we can no longer afford to let at-risk children, including those with ADHD, fail in school. Their failure not only increases the risk of "dropping out . . . unemployment . . . claiming welfare benefits . . . problems with authority, and . . . penal incarceration,"[2] but also deprives society of contributions they could have made had their potential been developed. Each wasted life is a tragedy. As educators responsible for the nourishment and growth of future generations, we must find better ways to help children meet our standards and expectations. We need to take a hard look at how we can reach and teach[3] them where they are.

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AEL
APPALACHIA EDUCATIONAL LABORATORY
PO Box 1348
Charleston, WV
25325-1348

Telephone:
304/347-0400
800/624-9120
304/347-0487 (FAX)

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